# TCEQ Interoffice Memorandum

**To:** Tony Walker
Director, TCEQ Region 4, Dallas/Fort Worth
Alyssa Taylor
Air Section Manager, TCEQ Region 4, Dallas/Fort Worth

**From:** Shannon Ethridge, M.S. SE
Toxicology Division, Chief Engineer's Office

**Date:** June 16, 2011

**Subject:** Toxicological Evaluation of Results from an Ambient Air Sample for Volatile Organic Compounds Collected at Latitude 32.383586, Longitude -97.834969, Downwind of the Quicksilver Brisco East No. 2 Site in Granbury, Hood County, Texas

Sample Collected on March 24, 2011, ACL 110397 (Lab Sample 110397-0001)

## Key Points

- Reported concentrations of target volatile organic compounds (VOCs) were either not detected or were detected below levels of short-term health and/or welfare concern.

## Background

On March 24, 2011, a Texas Commission on Environmental Quality (TCEQ) Region 4 Air Investigator collected a 30-minute canister sample (Lab Sample 110397-0001) downwind of the Quicksilver Brisco East No. 2 Site in Granbury, Hood County, Texas (Latitude 32.383586, Longitude -97.834969). The sample was collected in response to a citizen complaint of an overwhelming natural gas odor, vomiting, and feeling ill. The investigator experienced did not experience odors or health effects during the sampling event. Meteorological conditions measured at the site or nearest stationary ambient air monitoring site indicated that the ambient temperature was 86°F with a relative humidity of 29.3%, and winds were from the east (90°) at 2.5 miles per hour. The sampling site was more than 500 feet from the possible source and/or the facility. The nearest location where the public could have access was between 300 and 500 feet from the possible source and/or the facility. The sample was sent to the TCEQ laboratory in Austin, Texas, and analyzed for a range of VOCs. The list of the target analytes that were evaluated in this review are provided in Attachment A. The VOC concentrations were reported in parts per billion by volume ($ppb_v$) (Attachment B and Table 1). Please note that the available canister technology and analysis method can not capture and/or analyze for all chemicals.

## Results and Evaluation

Reported VOC concentrations were compared to TCEQ's short-term health- and/or welfare-based air monitoring comparison values (AMCVs) (Table 1). Short-term AMCVs are guidelines used to evaluate ambient concentrations of a chemical in air and to determine its potential to result in adverse health effects, adverse vegetative effects, or odors. Health AMCVs are set to provide a margin of safety and are set well below levels at which adverse health effects are reported to occur in the scientific literature. If a chemical concentration in ambient air is less than its comparison value, no adverse health effects are expected to occur. If a chemical concentration exceeds its comparison value it does not necessarily mean that adverse effects will occur, but rather that further evaluation is warranted.

All of the 84 VOCs were either not detected or were detected below their respective short-term AMCVs. Exposure to levels of VOCs measured in this sample would not be expected to cause short-term adverse health effects, adverse vegetative effects, or odors.

Please call me at (512) 239-1822 if you have any questions regarding this evaluation.

# Attachment A

## List of Target Analytes for Canister Samples

| | | |
|---|---|---|
| ethane | 4-methyl-1-pentene | t-1,3-dichloropropylene |
| ethylene | 1,1-dichloroethane | 1,1,2-trichloroethane |
| acetylene | cyclopentane | 2,3,4-trimethylpentane |
| propane | 2,3-dimethylbutane | toluene |
| propylene | 2-methylpentane | 2-methylheptane |
| dichlorodifluoromethane | 3-methylpentane | 3-methylheptane |
| methyl chloride | 2-methyl-1-pentene + 1-hexene | 1,2-dibromoethane |
| isobutane | n-hexane | n-octane |
| vinyl chloride | chloroform | tetrachloroethylene |
| 1-butene | t-2-hexene | chlorobenzene |
| 1,3-butadiene | c-2-hexene | ethylbenzene |
| n-butane | 1,2-dichloroethane | m & p-xylene |
| t-2-butene | methylcyclopentane | styrene |
| bromomethane | 2,4-dimethylpentane | 1,1,2,2-tetrachloroethane |
| c-2-butene | 1,1,1-trichloroethane | o-xylene |
| 3-methyl-1-butene | benzene | n-nonane |
| isopentane | carbon tetrachloride | isopropylbenzene |
| trichlorofluoromethane | cyclohexane | n-propylbenzene |
| 1-pentene | 2-methylhexane | m-ethyltoluene |
| n-pentane | 2,3-dimethylpentane | p-ethyltoluene |
| isoprene | 3-methylhexane | 1,3,5-trimethylbenzene |
| t-2-pentene | 1,2-dichloropropane | o-ethyltoluene |
| 1,1-dichloroethylene | trichloroethylene | 1,2,4-trimethylbenzene |
| c-2-pentene | 2,2,4-trimethylpentane | n-decane |
| methylene chloride | 2-chloropentane | 1,2,3-trimethylbenzene |
| 2-methyl-2-butene | n-heptane | m-diethylbenzene |
| 2,2-dimethylbutane | c-1,3-dichloropropylene | p-diethylbenzene |
| cyclopentene | methylcyclohexane | n-undecane |

## Attachment B

4/12/2011

**Texas Commission on Environmental Quality**

Laboratory and Quality Assurance Section
P.O. Box 13087, MC-165
Austin, Texas 78711-3087
(512) 239-1716

**Laboratory Analysis Results**
**ACL Number: 110397**

ACL Lead: Karen Bachtel Region: T04 Date Received: 3/30/2011
Project(s): Barnett Shale

| Facility(ies) Sampled | City | County | Facility Type |
|---|---|---|---|
| Quicksilver Resources Incorporated | Granbury | Hood | Natural Gas |

Laboratory Procedure(s) Performed:

Analysis: AMOR006
Determination of VOC Canisters by GC/MS Using Modified Method TO-15
Procedure:
Prior to analysis, subatmospheric samples are pressurized to twice the collected volume using a sample dilution system. For analysis, a known volume of a sample is directed from the canister into a multitrap cryogenic concentrator. Internal standards are added to the sample stream prior to the trap. The concentrated sample is thermally desorbed and carried onto a GC column for separation. The analytical strategy involves using a GC with dual columns that are coupled to a mass selective detector (MSD) and a flame ionization detector (FID). Mass spectra for individual peaks in the total ion chromatogram are then used for target compound identification and quantitation. The fragmentation pattern is compared with stored spectra taken under similar conditions in order to identify the compound. For any given compound, the intensity of the quantitation fragment is compared with the system response to the fragment for known amounts of the compound. This establishes the compound concentration in the sample. For non-target compound peaks which are at least one-half the height of the internal standard, a library search is performed in an attempt to identify the compound solely upon fracture patterns. These tentatively identified compounds (TIC's) are reported as a sample specific footnote. Accurate quantitation of TICs is not possible. The FID is used for the quantitation of ethane, ethylene, acetylene, propylene and propane and identification is based on matching retention times of standards containing known analytes.

Sample(s) Received

Field ID Number: 20460 Laboratory Sample Number: 110397-0001 Sampled by: Jessica Minley
Sampling Site: Briscoe Unit Date & Time Sampled: 03/24/11 16:08:00 Valid Sample: Yes
Comments:
Canister 20460 was used to collect a 30-minute sample using OFC-057.

Please note that this analytical technique is not capable of measuring all compounds which might have adverse health effects. For questions on the analytical procedures please contact the laboratory manager at (512) 239-4894. For an update on the health effects evaluation of these data, please contact the Toxicology Division at (512) 239-1795.

Analyst: Jaydeep Patel Date: 04/12/11
Jaydeep Patel

Reviewed By: Karen Bachtel Date: 4/12/2011
Karen Bachtel

Technical Specialist: David Manis Date: 4/13/11
David Manis

## Laboratory Analysis Results

### ACL Number: 110397

### Analysis Code: AMOR006

Note: Results are reported in units of parts per billion by volume (ppbv)

| Lab ID | | 110397-0001 | | | | | |
|---|---|---|---|---|---|---|---|
| Field ID | | 20460 | | | | | |
| Canister ID | | 20460 | | | | | |
| Analysis Date | | 04/01/11 | | | | | |
| Compound | LOD | Concentration | SDL | Flags** | Concentration | SDL | Flags** |
| ethane | 0.50 | 5.4 | 1.0 | D1,T | | | |
| ethylene | 0.50 | 1.4 | 1.0 | L,D1,T | | | |
| acetylene | 0.50 | 0.54 | 1.0 | J,D1,T | | | |
| propane | 0.50 | 2.3 | 1.0 | L,D1,T | | | |
| propylene | 0.50 | 0.88 | 1.0 | J,D1,T | | | |
| dichlorodifluoromethane | 0.20 | 0.62 | 0.40 | L,D1 | | | |
| methyl chloride | 0.20 | 0.79 | 0.40 | L,D1 | | | |
| isobutane | 0.23 | 0.42 | 0.46 | J,D1 | | | |
| vinyl chloride | 0.17 | ND | 0.34 | D1 | | | |
| 1-butene | 0.20 | 0.80 | 0.40 | L,D1 | | | |
| 1,3-butadiene | 0.27 | ND | 0.54 | D1 | | | |
| n-butane | 0.20 | 0.68 | 0.40 | L,D1 | | | |
| t-2-butene | 0.18 | ND | 0.36 | D1 | | | |
| bromomethane | 0.27 | ND | 0.54 | D1 | | | |
| c-2-butene | 0.27 | ND | 0.54 | D1 | | | |
| 3-methyl-1-butene | 0.23 | ND | 0.46 | D1 | | | |
| isopentane | 0.27 | 0.17 | 0.54 | J,D1 | | | |
| trichlorofluoromethane | 0.29 | 0.29 | 0.58 | J,D1 | | | |
| 1-pentene | 0.27 | ND | 0.54 | D1 | | | |
| n-pentane | 0.27 | ND | 0.54 | D1 | | | |
| isoprene | 0.27 | ND | 0.54 | D1 | | | |
| t-2-pentene | 0.27 | ND | 0.54 | D1 | | | |
| 1,1-dichloroethylene | 0.18 | ND | 0.36 | D1 | | | |
| c-2-pentene | 0.25 | ND | 0.50 | D1 | | | |
| methylene chloride | 0.14 | 0.15 | 0.28 | J,D1 | | | |
| 2-methyl-2-butene | 0.23 | ND | 0.46 | D1 | | | |
| 2,2-dimethylbutane | 0.21 | ND | 0.42 | D1 | | | |
| cyclopentene | 0.20 | ND | 0.40 | D1 | | | |
| 4-methyl-1-pentene | 0.22 | ND | 0.44 | D1 | | | |
| 1,1-dichloroethane | 0.19 | ND | 0.38 | D1 | | | |
| cyclopentane | 0.27 | ND | 0.54 | D1 | | | |
| 2,3-dimethylbutane | 0.28 | ND | 0.56 | D1 | | | |
| 2-methylpentane | 0.27 | ND | 0.54 | D1 | | | |
| 3-methylpentane | 0.23 | ND | 0.46 | D1 | | | |
| 2-methyl-1-pentene + 1-hexene | 0.20 | 0.18 | 0.40 | J,D1 | | | |
| n-hexane | 0.20 | ND | 0.40 | D1 | | | |
| chloroform | 0.21 | ND | 0.42 | D1 | | | |
| t-2-hexene | 0.27 | ND | 0.54 | D1 | | | |
| c-2-hexene | 0.27 | ND | 0.54 | D1 | | | |
| 1,2-dichloroethane | 0.27 | ND | 0.54 | D1 | | | |
| methylcyclopentane | 0.27 | ND | 0.54 | D1 | | | |
| 2,4-dimethylpentane | 0.27 | ND | 0.54 | D1 | | | |
| 1,1,1-trichloroethane | 0.26 | ND | 0.52 | D1 | | | |
| benzene | 0.27 | 0.21 | 0.54 | J,D1 | | | |
| carbon tetrachloride | 0.27 | 0.07 | 0.54 | J,D1 | | | |
| cyclohexane | 0.24 | ND | 0.48 | D1 | | | |
| 2-methylhexane | 0.27 | ND | 0.54 | D1 | | | |
| 2,3-dimethylpentane | 0.26 | ND | 0.52 | D1 | | | |

## Laboratory Analysis Results

### ACL Number: 110397

### Analysis Code: AMOR006

| Note: Results are reported in units of parts per billion by volume (ppbv) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Lab ID | | 110397-0001 | | | | | |
| Compound | LOD | Concentration | SDL | Flags** | Concentration | SDL | Flags** |
| 3-methylhexane | 0.20 | ND | 0.40 | D1 | | | |
| 1,2-dichloropropane | 0.17 | ND | 0.34 | D1 | | | |
| trichloroethylene | 0.29 | ND | 0.58 | D1 | | | |
| 2,2,4-trimethylpentane | 0.24 | ND | 0.48 | D1 | | | |
| 2-chloropentane | 0.27 | ND | 0.54 | D1 | | | |
| n-heptane | 0.25 | ND | 0.50 | D1 | | | |
| c-1,3-dichloropropylene | 0.20 | ND | 0.40 | D1 | | | |
| methylcyclohexane | 0.26 | ND | 0.52 | D1 | | | |
| t-1,3-dichloropropylene | 0.20 | ND | 0.40 | D1 | | | |
| 1,1,2-trichloroethane | 0.21 | ND | 0.42 | D1 | | | |
| 2,3,4-trimethylpentane | 0.24 | ND | 0.48 | D1 | | | |
| toluene | 0.27 | 0.09 | 0.54 | J,D1 | | | |
| 2-methylheptane | 0.20 | 0.01 | 0.40 | J,D1 | | | |
| 3-methylheptane | 0.23 | ND | 0.46 | D1 | | | |
| 1,2-dibromoethane | 0.20 | ND | 0.40 | D1 | | | |
| n-octane | 0.19 | ND | 0.38 | D1 | | | |
| tetrachloroethylene | 0.24 | 0.21 | 0.48 | J,D1 | | | |
| chlorobenzene | 0.27 | ND | 0.54 | D1 | | | |
| ethylbenzene | 0.27 | 0.04 | 0.54 | J,D1 | | | |
| m & p-xylene | 0.27 | 0.10 | 0.54 | J,D1 | | | |
| styrene | 0.27 | ND | 0.54 | D1 | | | |
| 1,1,2,2-tetrachloroethane | 0.20 | ND | 0.40 | D1 | | | |
| o-xylene | 0.27 | ND | 0.54 | D1 | | | |
| n-nonane | 0.22 | ND | 0.44 | D1 | | | |
| isopropylbenzene | 0.24 | ND | 0.48 | D1 | | | |
| n-propylbenzene | 0.27 | ND | 0.54 | D1 | | | |
| m-ethyltoluene | 0.11 | ND | 0.22 | D1 | | | |
| p-ethyltoluene | 0.16 | ND | 0.32 | D1 | | | |
| 1,3,5-trimethylbenzene | 0.25 | ND | 0.50 | D1 | | | |
| o-ethyltoluene | 0.13 | ND | 0.26 | D1 | | | |
| 1,2,4-trimethylbenzene | 0.27 | ND | 0.54 | D1 | | | |
| n-decane | 0.27 | ND | 0.54 | D1 | | | |
| 1,2,3-trimethylbenzene | 0.27 | ND | 0.54 | D1 | | | |
| m-diethylbenzene | 0.27 | ND | 0.54 | D1 | | | |
| p-diethylbenzene | 0.27 | ND | 0.54 | D1 | | | |
| n-undecane | 0.27 | ND | 0.54 | D1 | | | |
| | | | | | | | |

## Laboratory Analysis Results

**ACL Number: 110397**

**Analysis Code: AMOR006**

Note: Results are reported in units of parts per billion by volume ( ppbv)

LOD - Limit of Detection.
ND - not detected
NQ - concentration can not be quantified.
SDL - Sample Detection Limit (LOD adjusted for dilutions).
INV - Invalid.
J - Reported concentration is below SDL.
L - Reported concentration is at or above the SDL and is below the lower limit of quantitation.
E - Reported concentration exceeds the upper limit of instrument calibration.
M - Result modified from previous result.
T- Data was not confirmed by a confirmational analysis. Data is tentatively identified.

* SDL is equal to LOD
** Quality control flags explanations are listed on the last page of this report.

TCEQ laboratory customer support may be reached at kbachtel@tceq.state.tx.us

**Table 1. Comparison of Monitored Concentrations in Lab Sample 110397-0001 to TCEQ Short-Term AMCVs**

| Lab Sample ID | 110397-0001 | | | | | |
|---|---|---|---|---|---|---|
| **Compound** | **Odor AMCV ($ppb_v$)** | **Short-Term Health AMCV ($ppb_v$)** | **LOD ($ppb_v$)** | **Concentrations ($ppb_v$)** | **Flags** | **SDL ($ppb_v$)** |
| 1,1,1-Trichloroethane | 380,000 | 1,700 | 0.26 | ND | D1 | 0.52 |
| 1,1,2,2-Tetrachloroethane | 7,300 | 10 | 0.2 | ND | D1 | 0.4 |
| 1,1,2-Trichloroethane | Not Available | 100 | 0.21 | ND | D1 | 0.42 |
| 1,1-Dichloroethane | 110,000 | 1,000 | 0.19 | ND | D1 | 0.38 |
| 1,1-Dichloroethylene | Not Available | 180 | 0.18 | ND | D1 | 0.36 |
| 1,2,3-Trimethylbenzene | Not Available | 250 | 0.27 | ND | D1 | 0.54 |
| 1,2,4-Trimethylbenzene | Not Available | 250 | 0.27 | ND | D1 | 0.54 |
| 1,2-Dibromoethane | 10,000 | 0.5 | 0.2 | ND | D1 | 0.4 |
| 1,2-Dichloroethane | 6,000 | 40 | 0.27 | ND | D1 | 0.54 |
| 1,2-Dichloropropane | 250 | 100 | 0.17 | ND | D1 | 0.34 |
| 1,3,5-Trimethylbenzene | Not Available | 250 | 0.25 | ND | D1 | 0.5 |
| 1,3-Butadiene | 230 | 1,700 | 0.27 | ND | D1 | 0.54 |
| 1-Butene | 360 | 50,000 | 0.2 | 0.8 | L,D1 | 0.4 |
| 1-Pentene | 100 | 2,600 | 0.27 | ND | D1 | 0.54 |
| 2,2,4-Trimethylpentane | Not Available | 750 | 0.24 | ND | D1 | 0.48 |
| 2,2-Dimethylbutane (Neohexane) | Not Available | 1,000 | 0.21 | ND | D1 | 0.42 |
| 2,3,4-Trimethylpentane | Not Available | 750 | 0.24 | ND | D1 | 0.48 |
| 2,3-Dimethylbutane | Not Available | 990 | 0.28 | ND | D1 | 0.56 |
| 2,3-Dimethylpentane | Not Available | 850 | 0.26 | ND | D1 | 0.52 |
| 2,4-Dimethylpentane | 290,000 | 850 | 0.27 | ND | D1 | 0.54 |
| 2-Chloropentane (as chloroethane) | Not Available | 190 | 0.27 | ND | D1 | 0.54 |
| 2-Methyl-1-Pentene +1-Hexene | 20 | 500 | 0.2 | 0.18 | J,D1 | 0.4 |
| 2-Methyl-2-Butene | 250 | 500 | 0.23 | ND | D1 | 0.46 |
| 2-Methylheptane | Not Available | 750 | 0.2 | 0.01 | J,D1 | 0.4 |

| Lab Sample ID | 110397-0001 | | | | | |
|---|---|---|---|---|---|---|
| **Compound** | **Odor AMCV ($ppb_v$)** | **Short-Term Health AMCV ($ppb_v$)** | **LOD ($ppb_v$)** | **Concentrations ($ppb_v$)** | **Flags** | **SDL ($ppb_v$)** |
| 2-Methylhexane | Not Available | 750 | 0.27 | ND | D1 | 0.54 |
| 2-Methylpentane (Isohexane) | 83 | 1,000 | 0.27 | ND | D1 | 0.54 |
| 3-Methyl-1-Butene | 250 | 8,000 | 0.23 | ND | D1 | 0.46 |
| 3-Methylheptane | Not Available | 750 | 0.23 | ND | D1 | 0.46 |
| 3-Methylhexane | Not Available | 750 | 0.2 | ND | D1 | 0.4 |
| 3-Methylpentane | Not Available | 1000 | 0.23 | ND | D1 | 0.46 |
| 4-Methyl-1-Pentene (as hexene) | 20 | 500 | 0.22 | ND | D1 | 0.44 |
| Acetylene | 620000 | 25000 | 0.5 | 0.54 | J,D1,T | 1 |
| Benzene | 2700 | 180 | 0.27 | 0.21 | J,D1 | 0.54 |
| Bromomethane (methyl bromide) | 21000 | 30 | 0.27 | ND | D1 | 0.54 |
| c-1,3-Dichloropropylene | Not Available | 10 | 0.2 | ND | D1 | 0.4 |
| c-2-Butene | 2100 | 15000 | 0.27 | ND | D1 | 0.54 |
| c-2-Hexene | Not Available | 500 | 0.27 | ND | D1 | 0.54 |
| c-2-Pentene | Not Available | 2600 | 0.25 | ND | D1 | 0.5 |
| Carbon Tetrachloride | 97000 | 20 | 0.27 | 0.07 | J,D1 | 0.54 |
| Chlorobenzene (phenyl chloride) | 210 | 100 | 0.27 | ND | D1 | 0.54 |
| Chloroform (trichloromethane) | 85,000 | 20 | 0.21 | ND | D1 | 0.42 |
| Cyclohexane | 420 | 1,000 | 0.24 | ND | D1 | 0.48 |
| Cyclopentane | Not Available | 1,200 | 0.27 | ND | D1 | 0.54 |
| Cyclopentene | Not Available | 2,900 | 0.2 | ND | D1 | 0.4 |
| Dichlorodifluoromethane | Not Available | 10,000 | 0.2 | 0.62 | L,D1 | 0.4 |
| Ethane | 180,000 | Simple Asphyxiant* | 0.5 | 5.4 | D1,T | 1 |
| Ethylbenzene | 170 | 20,000 | 0.27 | 0.04 | J,D1 | 0.54 |
| Ethylene | 270,000 | 500,000 | 0.5 | 1.4 | L,D1,T | 1 |
| Isobutane | 2,040 | 8,000 | 0.23 | 0.42 | J,D1 | 0.46 |
| Isopentane (2-methylbutane) | 1,300 | 1,200 | 0.27 | 0.17 | J,D1 | 0.54 |

| Lab Sample ID | 110397-0001 | | | | | |
|---|---|---|---|---|---|---|
| **Compound** | **Odor AMCV ($ppb_v$)** | **Short-Term Health AMCV ($ppb_v$)** | **LOD ($ppb_v$)** | **Concentrations ($ppb_v$)** | **Flags** | **SDL ($ppb_v$)** |
| Isoprene | 5 | 20 | 0.27 | ND | D1 | 0.54 |
| Isopropylbenzene (cumene) | 100 | 500 | 0.24 | ND | D1 | 0.48 |
| m & p-Xylene (as mixed isomers) | 80 | 1,700 | 0.27 | 0.1 | J,D1 | 0.54 |
| m-Diethylbenzene | 70 | 460 | 0.27 | ND | D1 | 0.54 |
| Methyl Chloride (chloromethane) | Not Available | 500 | 0.2 | 0.79 | L,D1 | 0.4 |
| Methylcyclohexane | 150 | 4,000 | 0.26 | ND | D1 | 0.52 |
| Methylcyclopentane | 1,700 | 750 | 0.27 | ND | D1 | 0.54 |
| Methylene Chloride (dichloromethane) | 160,000 | 3,500 | 0.14 | 0.15 | J,D1 | 0.28 |
| m-Ethyltoluene | 18 | 250 | 0.11 | ND | D1 | 0.22 |
| n-Butane | 1,200,000 | 8,000 | 0.2 | 0.68 | L,D1 | 0.4 |
| n-Decane | 620 | 1,750 | 0.27 | ND | D1 | 0.54 |
| n-Heptane | 670 | 850 | 0.25 | ND | D1 | 0.5 |
| n-Hexane | 1,500 | 1,800 | 0.2 | ND | D1 | 0.4 |
| n-Nonane | 2,200 | 2,000 | 0.22 | ND | D1 | 0.44 |
| n-Octane | 1,700 | 750 | 0.19 | ND | D1 | 0.38 |
| n-Pentane | 1,400 | 1,200 | 0.27 | ND | D1 | 0.54 |
| n-Propylbenzene | 3.8 | 250 | 0.27 | ND | D1 | 0.54 |
| n-Undecane | Not Available | 550 | 0.27 | ND | D1 | 0.54 |
| o-Ethyltoluene | Not Available | 250 | 0.13 | ND | D1 | 0.26 |
| o-Xylene | 380 | 1,700 | 0.27 | ND | D1 | 0.54 |
| p-Diethylbenzene | 0.39 | 460 | 0.27 | ND | D1 | 0.54 |
| p-Ethyltoluene | 8.3 | 250 | 0.16 | ND | D1 | 0.32 |
| Propane | 1,500,000 | Simple Asphyxiant* | 0.5 | 2.3 | L,D1,T | 1 |
| Propylene | 13,000 | Simple Asphyxiant* | 0.5 | 0.88 | J,D1,T | 1 |
| Styrene | 25 | 5,100 | 0.27 | ND | D1 | 0.54 |
| t-1,3-Dichloropropylene | Not Available | 10 | 0.2 | ND | D1 | 0.4 |

| Lab Sample ID | 110397-0001 | | | | | |
|---|---|---|---|---|---|---|
| **Compound** | **Odor AMCV ($ppb_v$)** | **Short-Term Health AMCV ($ppb_v$)** | **LOD ($ppb_v$)** | **Concentrations ($ppb_v$)** | **Flags** | **SDL ($ppb_v$)** |
| t-2-Butene | 2,100 | 15,000 | 0.18 | ND | D1 | 0.36 |
| t-2-Hexene | Not Available | 500 | 0.27 | ND | D1 | 0.54 |
| t-2-Pentene | Not Available | 2,600 | 0.27 | ND | D1 | 0.54 |
| Tetrachloroethylene | 770 | 1,000 | 0.24 | 0.21 | J,D1 | 0.48 |
| Toluene | 170 | 4,000 | 0.27 | 0.09 | J,D1 | 0.54 |
| Trichloroethylene | 3,900 | 100 | 0.29 | ND | D1 | 0.58 |
| Trichlorofluoromethane | 5,000 | 10,000 | 0.29 | 0.29 | J,D1 | 0.58 |
| Vinyl Chloride | Not Available | 26,000 | 0.17 | ND | D1 | 0.34 |

*A simple asphyxiant displaces air, lowering the partial pressure of oxygen and causing hypoxia at sufficiently high concentrations.
ppbv - Parts per billion by volume.
ND - Not detected.
NQ - Concentration can not be quantified.
LOD - Limit of detection.
SDL - Sample Detection Limit (LOD adjusted for dilutions).
INV - Invalid.
J - Reported concentration is below SDL.
L - Reported concentration is at or above the SDL and is below the lower limit of quantitation.
E - Reported concentration exceeds the upper limit of instrument calibration.
M - Result modified from previous result.
T - Data was not confirmed by a confirmational analysis. Data is tentatively identified.
D1 - Sample concentration was calculated using a dilution factor of 4.02**.**

## Table 2. TCEQ Long-Term Air Monitoring Comparison Values (AMCVs)

**Please Note: The long-term AMCVs are provided for informational purposes only because it is scientifically inappropriate to compare short-term monitored values to the long-term AMCV.**

| Compound | Long-Term Health AMCV ($ppb_v$) | Compound | Long-Term Health AMCV ($ppb_v$) |
|---|---|---|---|
| 1,1,1-Trichloroethane | 940 | Cyclopentane | 120 |
| 1,1,2,2-Tetrachloroethane | 1 | Cyclopentene | 290 |
| 1,1,2-Trichloroethane | 10 | Dichlorodifluoromethane | 1,000 |
| 1,1-Dichloroethane | 100 | Ethane | Simple Asphyxiant* |
| 1,1-Dichloroethylene | 86 | Ethylbenzene | 450 |
| 1,2,3-Trimethylbenzene | 25 | Ethylene** | 5,300 |
| 1,2,4-Trimethylbenzene | 25 | Isobutane | 800 |
| 1,2-Dibromoethane | 0.05 | Isopentane (2-methylbutane) | 120 |
| 1,2-Dichloroethane | 1 | Isoprene | 2 |
| 1,2-Dichloropropane | 10 | Isopropylbenzene (cumene) | 50 |
| 1,3,5-Trimethylbenzene | 25 | m & p-Xylene (as mixed isomers) | 140 |
| 1,3-Butadiene | 9.1 | m-Diethylbenzene | 46 |
| 1-Butene | Not Available | Methyl Chloride (chloromethane) | 50 |
| 1-Pentene | Not Available | Methylcyclohexane | 400 |
| 2,2,4-Trimethylpentane | 75 | Methylcyclopentane | 75 |
| 2,2-Dimethylbutane (Neohexane) | 100 | Methylene Chloride (dichloromethane) | 100 |
| 2,3,4-Trimethylpentane | 75 | m-Ethyltoluene | 25 |
| 2,3-Dimethylbutane | 99 | n-Butane | 800 |
| 2,3-Dimethylpentane | 85 | n-Decane | 175 |
| 2,4-Dimethylpentane | 85 | n-Heptane | 85 |
| 2-Chloropentane (as chloroethane) | 19 | n-Hexane | 190 |
| 2-Methyl-1-Pentene +1-Hexene | 50 | n-Nonane | 200 |

| Compound | Long-Term Health AMCV ($ppb_v$) | Compound | Long-Term Health AMCV ($ppb_v$) |
|---|---|---|---|
| 2-Methyl-2-Butene | 50 | n-Octane | 75 |
| 2-Methylheptane | 75 | n-Pentane | 120 |
| 2-Methylhexane | 75 | n-Propylbenzene | 25 |
| 2-Methylpentane (Isohexane) | 100 | n-Undecane | 55 |
| 3-Methyl-1-Butene | 800 | o-Ethyltoluene | 25 |
| 3-Methylheptane | 75 | o-Xylene | 140 |
| 3-Methylhexane | 75 | p-Diethylbenzene | 46 |
| 3-Methylpentane | 100 | p-Ethyltoluene | 25 |
| 4-Methyl-1-Pentene (as hexene) | 50 | Propane | Simple Asphyxiant* |
| Acetylene | 2,500 | Propylene | Simple Asphyxiant* |
| Benzene | 1.4 | Styrene | 110 |
| Bromomethane (methyl bromide) | 3 | t-1,3-Dichloropropylene | 1 |
| c-1,3-Dichloropropylene | 1 | t-2-Butene | Not Available |
| c-2-Butene | Not Available | t-2-Hexene | 50 |
| c-2-Hexene | 50 | t-2-Pentene | Not Available |
| c-2-Pentene | Not Available | Tetrachloroethylene*** | 3.8 |
| Carbon Tetrachloride | 2 | Toluene | 1,100 |
| Chlorobenzene (phenyl chloride) | 10 | Trichloroethylene | 10 |
| Chloroform (trichloromethane) | 2 | Trichlorofluoromethane | 1,000 |
| Cyclohexane | 100 | Vinyl Chloride | 0.45 |

*A simple asphyxiant displaces air, lowering the partial pressure of oxygen and causing hypoxia at sufficiently high concentrations.
**Long-term vegetation AMCV for Ethylene is 30 ppb.
***Long-term vegetation AMCV for Tetrachloroethylene is 12 ppb.